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content.

The method of the invention is depicted in block diagram form, generally at 10, in Fig. 1, and includes the steps of:

1. Preparation of a silicon substrate and deposition of a SiGe layer thereon, block 12.
2. Implantation of hydrogen ions, block 14.
3. Preparation of a glass substrate, block 16.
4. Surface treatment of the glass substrate and bonding of the SiGe layer to the glass substrate, block 18.
5. Thermal annealing, at a temperature of between about 350°C to 700°C for between about 30 minutes to four hours, of the bonded structures to facilitate wafer splitting, block 20.

In a variation of the method of the invention, a layer of epitaxial silicon may be deposited on the SiGe after proper process, e.g., after SiGe deposition, to reduce SiGe layer thickness and to smooth the surface by CMP or oxidation and etching.

Fig. 2 depicts a step of silicon substrate 22 preparation and epitaxial SiGe layer 24 deposition on silicon wafer 22. The germanium concentration is in a range of between about 10% to 60%, and may be graded or of uniform concentration throughout the SiGe layer. SiGe layer 24 has a thickness of between about 20 nm to 1000 nm. SiGe layer 24 is under biaxial compression strain and no relaxation occurs at this time.

Fig. 3 depicts the hydrogen ion implantation step 26, wherein  $H^+$  or  $H_2^+$  ions are implanted into SiGe layer 24. The dose is in a range of between about  $1 \times 10^{16} \text{ cm}^{-2}$  to  $5 \times 10^{17} \text{ cm}^{-2}$ , and the energy is in a range of between about 1 keV to 300 keV. Other gases, such as argon, helium, and/or boron may also be used or added in the implant step. The hydrogen is implanted in the

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